Journal of Paleolimnology 2014 vol.52 N1-2, pages 107-119

Subfossil Cladocera from surface sediment in thermokarst lakes in northeastern Siberia, Russia, in relation to limnological and climatic variables

Frolova L., Nazarova L., Pestryakova L., Herzschuh U.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Subfossil Cladocera were sampled and examined from the surface sediments of 35 thermokarst lakes along a temperature gradient crossing the tree line in the Anabar-river basin in northwestern Yakutia, northeastern Siberia. The lakes were distributed through three environmental zones: typical tundra, southern tundra and forest tundra. All lakes were situated within the continuous permafrost zone. Our investigation showed that the cladoceran communities in the lakes of the Anabar region are diverse and abundant, as reflected by taxonomic richness, and high diversity and evenness indices (H = 1.89 ± 0.51; I = 0.8 ± 0.18). CONISS cluster analysis indicated that the cladoceran communities in the three ecological zones (typical tundra, southern tundra and forest-tundra) differed in their taxonomic composition and structure. Differences in the cladoceran assemblages were related to limnological features and geographical position, vegetation type, climate and water chemistry. The constrained redundancy analysis indicated that TJuly, water depth and both sulphate (SO4 2-) and silica (Si4+) concentrations significantly ($p \leq 0.05$) explained variance in the cladoceran assemblage. TJuly featured the highest percentage (17.4 %) of explained variance in the distribution of subfossil Cladocera. One of the most significant changes in the structure of the cladoceran communities in the investigated transect was the replacement of closely related species along the latitudinal and vegetation gradient. The results demonstrate the potential for a regional cladoceran-based temperature model for the Arctic regions of Russia, and for and Yakutia in particular.

http://dx.doi.org/10.1007/s10933-014-9781-7

Keywords

Cladocera, Palaeolimnology, Russian Arctic, Temperature, Water depth